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Fern Notes. VII.

By GEO. E. DAVENPORT.

Cheilanthes lanuginosa, Nutt., var. *FIBRILLOSA*. (*C. fibrillosa*, Davenport, provisionally, in herbarium Mass. Hort. Soc'y).—I have now had in my possession for more than a year a strange *Cheilanthes* from California which has puzzled me greatly. Not being able to place it to my entire satisfaction, it was placed in the herbarium under the provisional name of *C. fibrillosa*, and held in reserve until the present time, when a careful re-examination leads me to refer it to *C. lanuginosa*, Nutt., as a variety. My principal object, however, in publishing it here is to call the attention of California botanists to it with the hope that it may lead to its re-discovery, and the collection of sufficient material to render its positive determination more certain.

It apparently comes between, and may ultimately unite, *C. lanuginosa* and *C. Parishii* (possibly *C. Szovitzii* as well), and the specimens indicate a plant of corresponding size. It lacks the characteristic scales of *Parishii*, and, while in every other way nearer to *lanuginosa* than to *Parishii*, differs from the former by its more rhizomataceous rootstocks, the presence of distinct fibrous hairs, or scales, intermixed with the tomentum, and a remarkable resemblance to *Notholena Newberryi*, for which it might be mistaken, but for the strongly revolute margins of the segments.

A plant with so many characters not distinctly its own is not likely to be a welcome addition to this section of *Cheilanthes*, and may prove hereafter to be a source of much perplexity to botanists.

I give a partial description as an aid to those who may have opportunities to search for it:

Plant 3' to 6' (or more ?) tall; rootstock rhizomataceous, forming dense, entangled clumps of short rhizomes clothed with dark, or blackish-brown, linear-lanceolate scales that gradually pass into lighter brown, linear (more slender than in *lanuginosa*) scales mixed with coarse fibres and tomentum at the base of the stipites, the latter chestnut-brown, terete, 2' to 3' long, at first tomentose with fibrous scales and wool (similar to that on the roots), becoming smooth with age; laminæ of equal length with, or slightly longer than, the stipites, .75' to 1.5' broad, tripinnate, loosely covered with deciduous tomentum, that along the rachises beneath persistent, tawny, and mixed with coarse fibres—whence the name *fibrillosa*.

Collected by the brothers Parish well down in one of the passes that open out on the south side of the San Jacinto Mts., in June 1882. Mr. Parish thinks that it had descended from a higher altitude, where it may be looked for.

Cheilanthes myriophylla, Desv., (*C. elegans*, Desv.; *C. villosa*, Davenport, provisionally, in herb. Mass. Hort. Soc'y only. Catal. Supplement).—I have received from Mr. Pringle's rich collection of 1884 an unusually fine series of forms of this species collected by him on limestone cliffs on the Santa Rita Mts. in Arizona.

The series shows great variation in characters that have frequently been made use of for specific purposes (such as the size and shape

of the fronds or segments; the presence or absence, or character of the tomentum; or the color, size and character of the scales) the value of which I am now led to question more seriously than ever. Such characters, it seems to me, can only be taken in connection with others of a more reliable nature, and must occupy a secondary place in any description.

Some of Mr. Pringle's specimens run very close to *C. scariosa*, and I suspect fairly represent that species as reported from Mexico; others are inseparable from *C. elegans*, Desv., and others again from *myriophylla*. All of these differences are clearly due to the different conditions under which the different plants grew.

In reply to my inquiries in this direction, Mr. Pringle wrote:

"It (this species) is at home only in limestone ledges, in dryest situations where there is least soil 'short and rigid,' as you note, and in shaded places with more earth, or richer mould 'taller and more lax.' But it is all one species."

The series is identical with that previously collected in the Huachuca Mts. by Mr. and Mrs. Lemmon, which Prof. Eaton (correctly as I think) referred to *C. myriophylla*, with the exception that Mr. Pringle's plants vary more in the direction of *C. elegans*, Desv., and some of them are more densely squamose than any received from Lemmon.*

One can see from these collections that Dr. Hooker acted wisely in writing *C. elegans* and *C. myriophylla* under one name.

The plant given in the Supplement to my Catalogue, merely as a matter of record for the herbarium, under the provisional name of *C. villosa*, is probably only a form of this species, to which it must be referred.

Botrychium Virginianum, Swz., why *Botrychium Virginicum*?—I had supposed that the correct synonymy of the *Botrychia* had become so clearly established through the labors of Dr. Milde, as pointed out by Prof. Eaton and myself, that no further corrections would be necessary, but Mr. Gilbert's note in the BULLETIN for July 1884, seems to indicate otherwise.

The right, *per se*, of every one to choose whatever name best pleases him may be undeniable, but in practice the wisdom of exercising that right is at least questionable as not tending to that uniformity so desirable in botanical science.

If we are to pay any regard to the laws of botanical nomenclature, then *B. Virginicum* ought no longer to be tolerated as against *B.*

* Prof. Lemmon tells me that Mr. Baker refers his Huachuca Mt. plant to *C. scariosa*, but while I am inclined to believe that the very scaly forms of both Lemmon's and Pringle's collections are the same as the plant from Mexico, which has been referred to *C. scariosa*, although I have no specimen for comparison, I think a more careful investigation will be needed to show that they are identical with the Peruvian type of that species. Prof. Eaton thinks they are not, and until such time as I can make a satisfactory investigation for myself I should defer wholly to his judgment.

The large series of forms which I have received from Prof. Lemmon and Mr. Pringle, to both of whom I am under great obligations, has placed in my hands some long wished for material and I hope now shortly to finish my paper on the *Myriophylla-Fendleri* group of *Cheilanthes*.

Virginianum, which takes precedence by at least ten years earlier publication (O. Swartz, in Schrad. *Journ. Botan.* 1800-1801).

The species was collected in Arizona during the past year by Mr. Pringle along with *Ophioglossum nudicaule*, *Notholaena Aschenborniana*, *Pellaea cordata*, *Pellaea atropurpurea*, *Notholaena nivea*, *Asplenium parvulum* and *monanthemum*, *Aspidium Filix-mas*, *Cheilanthes Pringlei*, and others.

Botrychium matricariaefolium, A. Br., why *Botrychium rutaceum*, Swz.?—The use of the name *B. rutaceum*, Swz. (Gilbert *l. c.*), as a synonym for this species is somewhat misleading. Dr. Milde has shown that Swartz was not acquainted with our plant, and that his *rutaceum* was only a form of *B. ternatum*, as verified in Swartz's own herbarium by Angström. There is therefore no propriety in writing *B. rutaceum*, Swz., for *B. matricariaefolium*, A. Br., at this late day, however much there might have been before the confusion into which the synonymy of the *Botrychia* was thrown by various writers was unravelled by Dr. Milde's masterly treatise.

I read Mr. Gilbert's note (*l. c.*) on the variation in the bud-forms in this species with much interest and pleasure.

I have myself previously recorded (see BULLETIN for September 1881) a single instance of variation in the bud-form of a mature specimen of this species, and of *B. simplex* also. Since that time I have examined a great many specimens without finding another instance, but have found the general character of the buds as heretofore described remarkably uniform and reliable. It should be remembered in connection with this that the full descriptions of the different buds in my veneration notes (BULLETIN, January 1878) were based upon mature veneration, and that sufficient qualification was made in the text for different stages of development. In reference to the present species, I therein stated that while the matured form of the bud is so distinct from that of every other species that one could not possibly mistake it for any other, yet, in its earlier stages of development, it at one time bears some resemblance to the matured bud of *B. simplex*, at another time to the matured bud of *B. Lunaria*, and only gradually assumes with its growth its distinctive character. It will be observed, however, that even in its youngest condition it is not only distinguished from the bud of *B. simplex* by the partially curved apex of the sterile portion, but by the significant development of the common stalk, that being by far the longest portion of the whole bud, whereas in *B. simplex* the common stalk is usually the shortest. To this, adding that, in the three smaller species, being given specimens of an equal and corresponding growth, the buds will be found to be distinct and characteristic.

These views I have as yet seen no reason to change, and it is to be expected from them that in this species, whenever from any cause plants fail to mature fully, some deviation from the fully described, matured venation is to be looked for, though not of sufficient character to prevent determination.

In cases, however, where there may be a doubt otherwise, an examination of the spores must be resorted to, as previously stated. (Veneration Notes, *l. c.*)

Woodsia Mexicana, Fée.—The *Woodsia* from Lower California mentioned in my Distribution Notes as likely to be *W. obtusa* proves to be this species instead.

Mr. Orcutt has now re-collected it and supplied me with sufficient material to render its positive determination reasonably certain.

My thanks are due to Mr. Orcutt for his kindness in this, and also for his efforts to procure for me other ferns, in which I trust he will yet meet with equal success.

Notes on the Flora of Yellowstone Park.

By FRANK TWEEDY.

There is probably not an area of equal size in the United States which has as varied topographical features as the region of the Yellowstone Park, with its elevated plateaux and lofty mountain ranges, cañons, rivers and cataracts. Here also is the great continental water-shed. The central portion is mainly a high, rolling, heavily timbered plateau varying from 7,500–8,500 feet above sea-level and bordered by mountain ranges on the west, north and east. It is to this interior region and to a few adjacent mountain summits that the following observations were limited. On travelling through the Park one is struck by the monotony of the forests as regards variety in species. The black pine (*Pinus contorta*, Dougl., var. *Murrayana*, Engelm.) is the prevailing tree at low altitudes, forming at least 90 per cent. of the forest area, mingled with a scanty growth of Douglas spruce (*Pseudotsuga Douglasii*, Engelm.) on sparsely wooded slopes. The latter are small and not to be compared with the noble tree of the Pacific coast. We were surprised at the general absence of the yellow pine (*Pinus ponderosa*, Dougl.), but probably the rainfall is too great for the healthy development of this species. Above 8,000 feet, and even lower, dependent upon situation as regards temperature and moisture, occur the spruce (*Picea Engelmanni*, Engelm.) and the fir (*Abies subalpina*, Engelm.). The latter, much resembling the eastern balsam fir in growth and habit, clothes the cold, wet mountain slopes up to the timber-line, which here is nearly 1,000 feet. The black pine is not entirely confined to the plateau region, but often ascends to the timber-line along the dryer ridges where it is frequently found with the western white pine (*Pinus flexilis*, James). A few red cedars are scattered over the sage-brush areas, and *Juniperus communis*, L., var. *alpina*, L., on alpine summits and more rarely around the geyser basins. A birch (*Betula occidentalis*) and the aspen (*Populus tremuloides*, Michx.) are mostly confined to moist bottoms along streams. Early in August we occupied a camp in a small opening, half bog, half meadow, on the eastern slope of the Gallatin Range. On either side were the fir-clad slopes of high mountain peaks. Scattered over the meadow were patches of low willows (*Salix Geyeriana*, Anders.) and birches (*Betula glandulosa*, Michx.) mingled with great quantities of *Potentilla fruticosa*, L., the most characteristic shrub of the mountain bogs. Blue gentians were massed in great profusion over the surface of the bog, *Gentiana serrata*, Gunner, everywhere, *G. Forwoodii*, Gray, and *G. amarella*, L., var. *acuta*, Hook., less